

EB Chiono

4 FEB 1970

Director of Logistics

Chief, Real Estate and Construction Division, OL

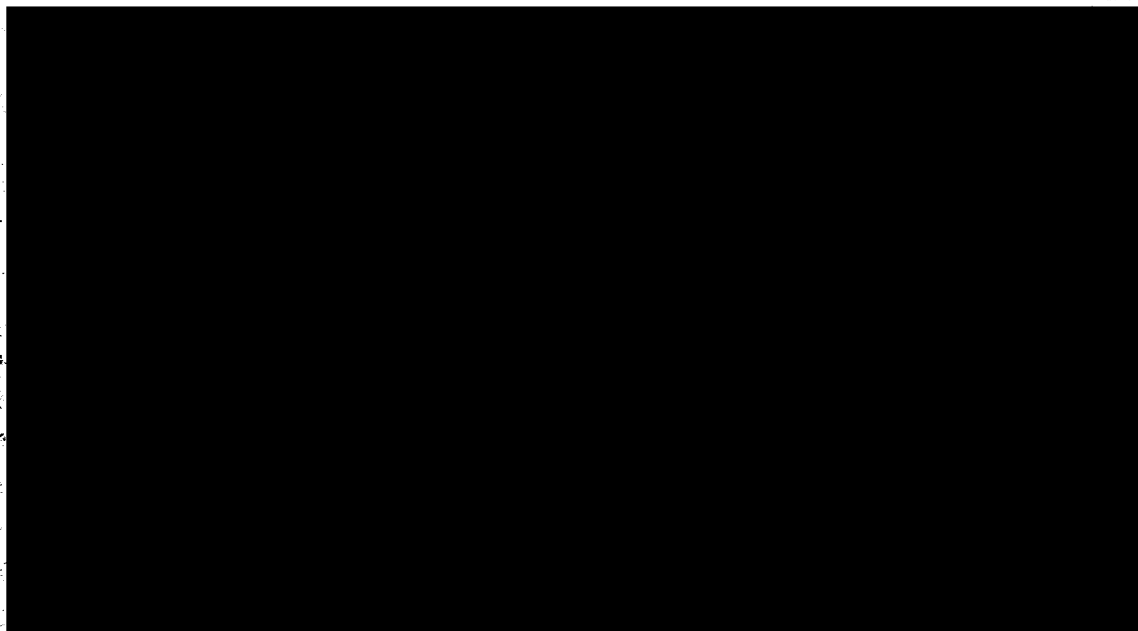
Recent Waterline Break, North Cafeteria Entrance

REF : Memo dtd 19 Jan 70 to C/RECD/OL and C/LSD/OL fr D/L, same subject

1. This memorandum is in response to a requirement levied by the Director of Logistics for information regarding a recent waterline break at Headquarters. This requirement was set forth in the reference.

2. System Description:

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3. Waterline Failures:

a. Since building occupancy a little over eight years ago, there has been a history of five line breaks in the exterior secondary system. All breaks appear to have been caused by displacement of the surrounding soil.

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b. Recent breaks involve a double break adjacent to the powerhouse and the one to which the Director of Logistics alluded in his memorandum that is to say, the one in the vicinity of the cafeteria. Both breaks have been reconnected and service through the break restored.

**4. Causative Factors:**

Investigation of the reasons for exterior failures point to one fundamental cause--continuing ground settlement under adverse ground water conditions. While the written record is meagre, GSA plumbing personnel, from whom the greater part of our information was gained, remember the breaks as having both vertical and lateral relative displacement indicating soil movement. Indications point to occurrence after snow melts or intense rainfall and resultant runoff or absorption. A check of plans and borings lead us to believe that breaks occurred in disturbed soil (fill) areas and that this material was largely material excavated from the building sites and redistributed to conform to designed contours. If this is true, the soil in general consists of a micaceous, sandy clay. According to technical references, this type of soil has low shear strength when wet. The additional weight of snow at the surface and interstitial water exceeds the soil shearing strength. Slope instability results. In addition, there may be natural long-term settlement due to soil dewatering in the lower layers.

**5. Corrective Action:**

While water service has been restored, earthwork has not been completed. In the case of the powerhouse location, piping realignment will be carried out by anchoring the opposing parts with concrete blocks, tie-down rods, and compacted earthwork. This work is now under contract and is scheduled for completion before 27 April 1970. Earthwork in connection with the cafeteria entrance break will be deferred until freezing weather, heavy spring rains, and runoff permit soil conditions under which optimum compaction can be realized. The firm of Carson and Gruman of Washington, D. C., is under contract to GSA to accomplish this work in 30 days after receipt of notice to proceed. This notice will be issued when the weather outlook appears to warrant so doing.

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**6. Conclusions:**

We believe settlement will continue and the factors which have led to waterline breaks in the past will remain with us. More breaks may be expected over a period of years. System reliability will be obtained by optimizing the redundancy factor. This reasoning is based on the assumption that the chance of two breaks in separate critical locations is indeed remote. Two actions may be taken to obtain this optimization. Both provide additional looping to the present system.

**7. Recommendations**

a. Construct a 6-inch connection inside the Headquarters Building between cold water service lines serving the north and south wings of the building. A cost of \$25,000 has been assigned to this proposal.

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c. A study in depth of this system is contemplated under the Headquarters utility study. This study should take advantage of factors brought to light in this investigation and make appropriate recommendations concerned with redundancy of the fire protection aspect of the system, improvement in sectionalizing, devising routine procedures for using leak detection equipment in order to discover leaks before they become visually apparent on the surface, and to make such other recommendations as may be indicated to enhance system reliability. No additional cost is anticipated in adding these specific requirements to the utilities survey.

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(4 February 1990) Approved For Release 2001/08/09 : CIA-RDP86-00244R000300380003-0

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